

# PATENT SPECIFICATION

NO DRAWINGS



6011

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International Classification:—F06g.

## COMPLETE SPECIFICATION

### Improvements in or relating to Belting for Conveyors, Elevators or the Transmission of Power

- We, JOHN LEWIS, a British subject, of 4, Abbey Lodge, Park Road, London, N.W.8, and RUBBER IMPROVEMENT LIMITED, a company registered under the laws of Great Britain, of Rilex Works, London Road, Wellingborough, Northamptonshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- This invention relates to multi-ply vinyl belting, i.e. belting made of two or more layers of textile material with an interlayer or interlayers and covers of fire-resisting vinyl polymer material.
- The cotton duck hitherto used as the textile material does not in some cases provide the requisite tensile strength longitudinally of the belting.
- Continuous filament polyethylene terephthalate might be used to provide a stronger textile material but such material suffers from certain disadvantages particularly the following:—
- (a) it does not adhere well to the vinyl polymer.
  - (b) its body or stiffness is not good.
  - (c) it is non-absorbent and hence is not made satisfactorily fire-resistant by liquid vinyl polymer when the belt is overheated in service.
- The present invention consists of a multi-ply vinyl belting in which the warp threads of the textile plies consist at least in part of polyethylene terephthalate continuous filament yarn and the weft threads consist at least in part of a natural staple fibre.
- The natural staple fibre serves to increase the adhesion and stiffness and to absorb the molten vinyl material under conditions of overheating of the belting to provide the fire-resistance.
- The textile plies may be made of polyethylene terephthalate continuous filament doubled with natural staple fibre yarn to produce a composite thread which should be of not less than 1000 denier.
- The preferred proportions of the two types of yarn forming the composite thread are between and including the limits 1 of polyethylene terephthalate to 1 of natural staple fibre and 1 of polyethylene terephthalate to 3 of natural staple fibre.
- Alternatively, the warp threads may be of polyethylene terephthalate yarn only, while the weft threads are of natural staple fibre yarn only.
- Other combinations are possible within the scope of the invention.
- Preferably there are at least 16 ends per inch width of warp yarn.
- Suitable natural staple fibres are cotton, jute and flax, jute being preferred.
- Belting made in accordance with the invention has been found to be of about double the tensile strength of the corresponding belting made with cotton duck plies (or alternatively can be made lighter and more flexible for the same strength). It is also found to maintain its strength over a wider range of conditions, such as variation of humidity and acidity better than the corresponding belting of cotton duck plies.
- The weave employed for the textile plies may be chosen so that the absorbent natural staple fibre is exposed at the surface of the plies as much as possible thereby promoting adhesion of the vinyl material to the plies. A preferred weave is a broken twill.
- The invention will be further described with reference to the following example of typical belting construction according to the invention.
- A composite duck is woven from polyethylene terephthalate warps and jute wefts as follows:—

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## Warp Threads.

Polyethylene terephthalate continuous filaments 3000 denier.

## Weft Threads.

5 Jute—24 lbs. breaking strain.

## Construction.

Warp—22 ends per inch.

Weft—14 picks per inch.

Broken twill weave.

10 The resulting duck is coated on each surface with a layer of non-inflammable plasticised polyvinyl chloride of the following composition:—

	Polyvinyl chloride	-	-	-	100
15	Tri tolyl phosphate	-	-	-	80
	Calcium stearate	-	-	-	2

Total=182

The coatings may then be partly or completely heat-fused prior to further fabrication.

20 The coatings may be applied by any convenient method such as calendering, doctor knife coatings, roller coatings or dipping.

A plurality of such coated duck layers are then superimposed, together with unsupported layers of plasticised P.V.C. (to form outer covers of the belt) and fused together by the combined action of heat and pressure.

25 The outer layers of P.V.C. may also be applied by any of the methods outlined in the penultimate paragraph.

30 The fusion of the various layers to form a consolidated laminate is preferably achieved in a rotary press. It may also be achieved in other similar machines and on platen presses commonly used for such purposes. The necessary heat is preferably introduced into the individual plies of the laminate prior to applying moulding pressure but may be applied to the complete assembly of plies whilst under pressure.

35 A temperature of at least 150° C. throughout the mass is normally required and a mechanical pressure of 10 lbs. per square inch minimum is preferred in the laminating process.

45 Application of edge covering to the trimmed laminate can be accomplished by moulding as a separate operation or can be performed simultaneously with the lamination process. In either case the application of an extruded P.V.C. strip is a preferred method.

By means of this invention a thinner belt may be obtained for a given tensile strength which aids warp flexibility, but at the same time achieves a stiffness or semi-rigidity across the width of the belt so that it troughs suitably in accordance with recognised needs. Rigidity of the width is achieved in present belts by using standard cotton duck. It has been found that this stiffness or semi-rigidity in the width can be achieved more satisfactorily by weaving polyethylene terephthalate in the manner described in the specification in the warp.

## WHAT WE CLAIM IS:—

1. A multi-ply vinyl belting in which the warp threads of the textile plies consist at least in part of polyethylene terephthalate continuous filament yarn and the weft threads consist at least in part of natural staple fibre.

2. A multi-ply vinyl belting as claimed in Claim 1, in which the textile plies are made of polyethylene terephthalate continuous filament doubled with natural staple fibre yarn to produce a composite thread.

3. A multi-ply vinyl belting as claimed in Claim 2, in which the composite thread is 1000 or more denier.

4. A multi-ply vinyl belting as claimed in Claim 1, in which the warp threads are of polyethylene terephthalate only and the weft threads are of natural staple fibre yarn only.

5. A multi-ply vinyl belting as claimed in any of the preceding claims, in which there are at least 16 ends per inch width of warp yarn.

6. A multi-ply vinyl belting as claimed in any of the preceding claims, in which the natural staple fibre is cotton yarn.

7. A multi-ply vinyl belting as claimed in any of Claims 1 to 5 in which the natural staple fibre is jute yarn.

8. A multi-ply vinyl belting as claimed in any of the preceding claims in which the weave employed for the textile plies is a broken twill.

9. A multi-ply vinyl belting substantially as described in the example given.

10. A method of forming multi-ply vinyl belting substantially as described in the example given.

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## PROVISIONAL SPECIFICATION

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belting, i.e. belting made of two or more lengths of textile material with an interlayer or interlayers and covers of fire-resisting vinyl polymer material.

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phthalate might be used to provide a stronger textile material but such a material suffers from certain disadvantages particularly the following:—

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- (c) it is non-absorbent and hence is not made satisfactorily fire-resistant by liquid vinyl polymer when the belt is overheated in service.

10 The present invention consists of a multi-ply vinyl belting in which the warp threads of the textile plies consist at least in part of polyethylene terephthalate continuous filament yarn and the weft threads consist at least in part of a natural staple fibre.

20 The natural staple fibre serves to increase the adhesion and stiffness and to absorb the molten vinyl material under conditions of overheating of the belting to provide the fire-resistance.

25 The textile plies may be made of polyethylene terephthalate continuous filament, doubled with natural staple fibre yarn to produce a composite thread which should be of not less than 1000 denier.

30 Alternatively the warp threads may be of polyethylene terephthalate yarn only while the weft threads are of natural staple fibre only.

Other combinations are possible within the scope of the invention.

Preferably there are at least 100 ends per inch width of warp yarn.

Suitable natural staple fibres are cotton, jute 35 being preferred.

Belting made in accordance with the invention has been found to be of about double the tensile strength of the corresponding belting made with cotton duck plies (or 40 alternatively can be made lighter and more flexible for the same strength). It is also found to maintain its strength over a wider range of conditions, such as variation of humidity and acidity better than the corresponding belting 45 of cotton duck plies.

The weave employed for the textile plies may be chosen so that the absorbent natural staple fibre is exposed at the surface of the plies as much as possible thereby promoting adhesion of the vinyl material to the plies. A preferred weave is a broken twill. 50

The preferred proportions of the two types of yarns is between and including the limits 1 of polyethylene terephthalate to 1 of material 55 staple fibre and 1 of polyethylene terephthalate to 3 of natural staple fibre.

Various modifications may be made within the scope of the invention.

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